AN

ESSAY

TOWARDS A MORE

Advantageous METHOD,

Than hath been hitherto generally practiſed of Educating YOUTHS

Deſign'd for Buſineſs.

By *ROBERT HARTSTONGE*,
Teacher of a Private School in *YARMOUTH.*

The ill Method of Schooling does not only occaſion a great Loſs of Time there, but alſo does beget in Lads a very odd Opinion and Apprehenſion of Learning; and much diſpoſes them to be idle, when got a little free from the uſual Severities. Inquiry into the Occaſion of the Contempt of the Clergy and Religion, *Page* 11.

Children, like tender Oziers, take the Bow,
And as they firſt are faſhion'd always grow.
Dryd. Jun. Juv.

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PREFACE.

THO' *the Deſign of the few following Pages be to oppoſe a receiv'd Cuſtom, as being (eſteem'd) of evil Conſequence, yet in Things indifferent, which can have no evil Tendency, where Cuſtom has prevail'd, 'twere a Crime to diſſent: And the* Preface *being now generally thought as Neceſſary to a Book as the* Title Page, *it would have been Preſumption in me to have ſin'd againſt ſo prevailing a Practice.*

Two Things are chiefly to be regarded in a Preface, viz. *The Uſefulneſs of the Subject treated on, and the Author's Reaſons for writing on that Subject.*

Firſt, *The Uſefulneſs of Education, (my preſent Subject) none but the Savage Part of Mankind will deny: And,*

Second, *My Reaſons for Writing, the Book itſelf diſcovers from* Alpha *to* Omega.

What therefore I have further to ſay by Way of Preface is, To aſſure my Readers that this Pamphlet was not wrote with any

oſtentatious View, or fond Affectation of appearing more Knowing than I really am; but with a well-meaning hearty Deſire of contributing my Mite towards the removing ſuch Remora's, *and remedying ſuch Inconveniencies in the Education of the Men of Buſineſs, as I was thorowly perſuaded were not only Hinderances in the Progreſs of their Learning, but Miſtakes in Fundamentals: And (I freely own) not without a modeſt Hope, that this may, (as 'tis an honeſt Deſign) prove a Means of increaſing the Number of my Pupils, conſequently of* **** —— *For tho' Teaching School be an Imployment honourable enough in itſelf, as tending to improve the Mind, inlarge the Faculties, and meliorate the Inflexibility of our Natures; yet what Mr.* Butler *ſays in his* Hudibraſs *is applicable enough to this Buſineſs,* viz.

It is (like others) Glorious, when
'Tis Great and Large; but Baſe, if Mean.

And Laſtly, as I am not ſo weak to imagine I ſhall wholly eſcape Cenſure, ſo I pay no Court to Temerarious Readers; but as Perſius *ſays, in Mr.* Dryden's *Engliſh,*

" Their Smiles and Cenſures are to me the ſame;
" I care not what they praiſe, or what they blame."
But to all Candid and Judicious Men,
I vail with Rev'rence, and ſubmit my Pen:
And if to ſuch this ESSAY ſhall appear
A Rational Attempt, I've nought to Fear.

From my School in *Blind-Middle-Street Yarmouth, November 27th,* 1727.

R. Hartſtonge.

AN

AN ESSAY, &c.

SO Prevalent is a long retain'd Cuſtom, and ſo hard are People to be brought off from what they have been long inur'd to, that altho' they be (in good Meaſure) made ſenſible of the ill Effects of the Continuance, and tho' the Advantages, nay almoſt Neceſſity of an Innovation be never ſo apparent, yet the Ruſt of Prejudice has eat ſo deep into their Inclinations, that they will by no Means conſent to the leaſt Alteration, tho' demonſtrably carrying with it all the Advantages that can poſſibly be expected or deſir'd. For,

'Tis Cuſtom that does ſtill diſpence
An Univerſal Influence,
And make Things right or wrong appear,
Juſt as they do her Liv'ry wear. Hud.

This Truth is in no one Inſtance more conſpicuous, than the preſent general Method of Educating the Youths *deſign'd for Buſineſs*; the greateſt Part of whoſe almoſt invaluable Time is, (altogether unprofitably for them) with much Toil and Labour ſpent in gaining a ſmall Smattering of a Language they are never like to be Maſters of, and which they are ſure to forget when they come to Buſineſs, becauſe no Way uſeful; at the ſame Time their **Mother Tongue** is neglected, which if a proper Method were uſed, and a tolerable Time imploy'd, would be found both copious and extenſive enough, to inform them how Elegantly to expreſs themſelves on any, even the niceſt Subject; and ſurely then ſufficient to furniſh them with a juſt Propriety of Expreſſion ſerviceable to the ſeveral Parts of Buſineſs. But ſuppoſing after Seven or Eight Years of Slavery ſpent in learning *Latin*, that they were Maſters of that Language; what corroding Reflections muſt it needs create in any thinking Man, when he conſiders that the only Time of Life allow'd

him

him for proper Education has been thus fatally miſtaken and irrecoverably loſt? And that the Time which ought to have been imploy'd in learning Arithmetick and Book-Keeping, (eſſential to his Buſineſs) has been idlely waſted in learning to read a Story in *Latin* how *Phaeton* broke his Neck; and when he ſhould have been ſtudying Geometry, Mechanics, or ſome ſuch Branch of Mathematical Learning, on which the Buſineſs he is in does moſt immediately depend, his Time was ridiculouſly beſtow'd in finding how many Nutts and Apples *Tyterus* had for his Supper;

Or tell who nurs'd Anchiſes; *or to name*
Anchemolus's *Step-mother, whence ſhe came*:
How long Aceſtes *liv'd, what Stores of Wine*
He gave to the departing Trojan *Line?* Dryd.

Thus vainly, thus fruitleſly having waſted almoſt all the Time allotted for Childrens Education, (the gaining ſome ſmall Share of Writing only excepted) they are then ſent for Half or Three Quarters of a Year (for longer Time cannot be ſpared from their Entrance upon Buſineſs) to learn thoſe Qualifications which ought to have taken up (if not the Whole) the greateſt Share of their Time: But alas! Opportunity once loſt, can never be retriev'd; 'tis now too late, and altogether

 impoſſible

impoſſible for them in ſo ſhort Time, let their Maſters be ever ſo painful and able Teachers, or their Parts and Capacities ever ſo bright and ſtrong, to make any ſuch conſiderable Progreſs in thoſe Kinds of Studies, as may gain or return Credit to their Maſters, or Profit and Satisfaction to themſelves. 'Tis true indeed there are ſome particular Branches of Buſineſs, which for a Man to appear to Advantage in, do require ſome Knowledge in the *Latin*, ſuch are, Attorneys, Apothecaries, *&c.* But as they are not many, I ſhall only obſerve, *Firſt*, That the Acquirements I am now contending for, are as Eſſential to, and Expletive of ſuch Imployments as the *Latin*. *Second*, That their Attainments require both Time and Application; and *Thirdly*, That an over Sedulity towards one, and Supinity towards another Qualification equally neceſſary, argues a Defect in Judgment.

Thus far indeed the Fault may be chiefly laid at the Parents Doors; but there are other groſs Defects in this Branch of Education, ſo groſs as to render the utmoſt Efforts both of Maſter and Scholar in a great Meaſure ineffectual; and thoſe lay chiefly in the Practice of Teaching: To attempt a Remedy for which, is the chief Deſign of this *Eſſay*.

And

And the firſt Particular which offers itſelf to our Conſideration, is the common Practice (for Method I cannot call it) of teaching *Engliſh*, which undoubtedly is the worſt that could poſſibly have obtain'd; for let it but be conſider'd how unſurmountable the Difficulty muſt needs be even to the brighteſt Genius, to be enter'd (as ſoon as the Alphabet is learn'd) immediately into the Body of a Language, without any previous Acquaintance either with the Power of Letters, Formation of Syllables, Modes of Pronounciation, or other Rules of Orthography eſſential to it: One Inſtance (amongſt many that might be brought) of the ill Effects of this Way of Proceeding, is, that vicious Pronunciation ſo commonly obſerv'd, eſpecially amongſt the Natives of this Town of *Yarmouth*: What can be more diſtaſteful, harſh, and diſagreeable to an elegant Ear, than to hear a Perſon miſcall and confound the Juice of the Grape for the Grape Tree? Or more ridiculous than inſtead of the following Sentence, *viz.* *Valour very much contributes towards Victory, and the loud united Voices of the Vulgar Soldiers diſcourage the Enemy*; to hear a Perſon ſay, *Walour wery much contributes towards Wictory, and the loud united Woices of the Wulgar Soldiers*

diers diſcourage the Enemy. To find a Remedy for theſe and the like Inconveniencies, have taken up the Thoughts and imploy'd the Pens of many ingenious Men; ſome of which have acquitted themſelves with much Accuracy, and given ſuch Helps in their ſeveral Performances, as cannot fail (if they be carefully practiſed) of anſwering the Purpoſes for which they were intended. It is indeed much to be wiſh'd, that thoſe who ſet at the Helm of Government would not think it below their Notice, but take ſome care to eſtabliſh an agreeable Method to be practiſed by all Teachers of *Engliſh*; but as this is more to be wiſh'd for than expected, *interim* we ought gratefully to embrace ſuch Helps as are offer'd.

But 'tis neceſſary in this Place to remove a ſeeming formidable Objection, which (by the leſs conſiderate) is frequently made againſt what I have now advanc'd, namely, "That "whatever Improvements may be made in "the common Methods of teaching *Engliſh*, "all will not ſuffice; for without ſome Know-"ledge of the *Latin*, 'tis impoſſible to ſpell "rightly, or write Senſe.

But the Fallacy of this Objection may be eaſily detected by a Thouſand Witneſſes, and

every

every Day's Experience plainly contradicts it; beſides, were we to allow it any Force, it would equally oblige the young *Tyro*'s to learn *Greek*, *Spaniſh*, *Italian*, *French*, *High* and *Low Dutch*, and many more Languages, eſpecially the *Old Saxon*, from whence we fetch moſt of our Words of common and general Uſe. Again, thoſe Words which come from the *Latin*, are of all others moſt eaſily ſpelt. *Firſt*, Becauſe they have no ſuperfluous Letters. *Second*, Every Letter has its full Power. And *laſtly*, every Syllable (generally ſpeaking) writ as 'tis ſounded. So that 'tis not ſo much learning *Latin*, as a cloſe Application to *Engliſh*, that muſt remove the Difficulty of Spelling; it reſting chiefly in ſuch Words as are purely *Engliſh*, *viz.* of *Saxon* Original. And as to writing Senſe, the Objectors can mean only the Rules of Grammar; but thoſe may and are with much more Facility and Expedition taught without the leaſt Knowledge of the *Latin*: For Grammar muſt not be conceiv'd as an Appendant to the *Latin* only, but as an abſolute Science of itſelf, teaching the true Nature and Diſtinction of Words and Sentences, and conſiſts of general Principles applicable to all Languages; and altho' the Want

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of an *Engliſh* Grammar was in the laſt Age a juſt Occaſion of Complaint, yet 'tis the Happineſs of the preſent to ſee (amongſt other ingenious Performances that Way) a complete Syſtem of *Engliſh* Education, under the Name of *Mr.* Brightland's *Grammar of the* Engliſh *Tongue, publiſh'd for the Uſe of Schools*; which Book, tho' it wears the Name of Mr. *Brightland* only, owes its Compoſure to many Polite and Learn'd Gentlemen, and Teaches not only Grammar, but *Poetry, Rhetoric, Logic, &c.* And as it has gain'd the Sanction of the moſt able Judges, can want no Encomiums from ſo low a Pen as mine. From which Book chiefly, I have for the Benefit of my own Scholars, compoſed a ſmall *Engliſh* Rudiment, built upon the Method of the *Latin*; by the Help of which, the Learner may arrive at a competent Knowledge in *Engliſh* Grammar.

The next Particular, which I would (if I might) recommend, is an Improvement in **Stile**, a Qualification of too great Importance, (when rightly conſider'd) to be ſo totally neglected as hitherto it has been in *Engliſh* Schools: Of what Advantage an early Improvement in this Kind was antiently thought, the Methods of Education practiſed

ctiſed in the *Spartan* and *Roman* Common-Wealths do more than ſufficiently teſtifie; and we ſcarce meet (in Hiſtory) with any Famous General of either Nation, who was not likewiſe a good Oratour: In ſhort, amongſt all civilized Nations to be a fine Speaker was ever accounted Excellent and Glorious, but the contrary Scandalous and Reproachful. But to keep more cloſe to our Purpoſe, an Improvement in Stile is of vaſt Advantage in Buſineſs; for he who cannot without Ambiguity or Abſurdity deliver his Thoughts, can hardly avoid bringing his Probity or his Intellects under Cenſure; whereas a tolerable Improvement in this Faculty, would quite remove both theſe Inconveniencies. Of Stile indeed there are many Kinds, but that which I am now concern'd for, and would have the Youths deſign'd for Buſineſs improv'd in, is a Natural, Eaſie, Flowing, yet Conciſe, Perſpicuous, and Significant Manner of expreſſing themſelves, and which may be call'd the *Mercantile Manner*: But the particular Method by which this may be beſt perform'd, I leave to the Judgment of ſuch ingenious Tutors as ſhall think proper to inſtruct their Pupils therein.

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Yet let me beg Leave here to recommend the giving Youths ſome Inſight into the Art of *Engliſh* Poetry, at leaſt ſo much of it as may ſerve to acquaint them with Quantity, Accent, and right Pauſing or Stopping; for this when in a tolerable Meaſure attain'd, will give both Beauty and Sweetneſs to their Pronunciation in reading Proſe: And altho' I am far from encouraging the Brood of Poetaſters, yet (I cannot but remark that) if the Pupil has a Genius, and the Maſter gives him (at proper Times) eaſie Themes to try his Parts upon, and be himſelf a Judge of Poetry, and knows how to correct, it will be a ſure Means of enlarging the Capacity of his Mind; and if he be accuſtom'd every Day to repeat without Book ſome ſhort Leſſon out of one of our beſt *Engliſh* Poets, it cannot fail of treaſuring up in his Memory ſuch a choice Collection of the beſt *Engliſh* Words and Phraſes, as will much facilitate his attaining an Elegant and Polite Stile.

In Senſe and Numbers if you would excell,
Read Wycherley, *conſider* Dryden *well*;
In one what vig'rous Turns of Fancy ſhine,
In th' other Syrens *warble in each Line.*
When tuneful Congreve *tries his rural Strains,*
Pan *quits the Woods, the liſt'ning Fauns the Plains,*
And Philomel *in Notes like his complains.* Garth.
Such is their Verſe, and always will appear
So ſweet, ſo charming to the raviſh'd Ear.

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The next Qualification, which falls naturally under Conſideration, is **Writing**; an Art in which to arrive at any commendable Degree of Perfection, requires exact Rules, and a ſedulous Application: The firſt adjuſt the Poſture of the Body, Poſition of the Hand, Shape and Proportion of the Letters, *&c.* the other gives Boldneſs and Freedom, which takes off that Stiffneſs ſo natural to and apparent in the Performances of all Young Noviles: But then this is not to be done by continuing them in ſingle-lin'd Copies, the general Practice in moſt Schools, (and which rather increaſes than takes off the Defect) but by bringing them by Degrees to write after larger Specimens, as firſt after Copper-Plate Pieces of the beſt Maſters; and when they begin to be ſomewhat confirm'd in an indifferent fair Character, then to uſe them to write after Letters, Accounts, and other well wrote Precedents of Buſineſs; (which is the conſtant Method I uſe in my School, and by which I have taught many to write much better than myſelf.) Theſe Things if they carefully and leiſurely perform at firſt, will not only eſtabliſh a good Hand-Writing, but inſenſibly lead them to Quickneſs and Diſpatch.

Arithmetic,

Arithmetic claims next to be consider'd, as being the Essence and Soul of all Business; a Science! whose Worth is beyond the Power of Words to express. I shall not therefore endeavour at a Panegyric on the Art, but briefly offer my Reasons for not coming into the general Method of Teaching it, subjoining some Considerations towards Establishing a more advantageous one in its Stead.

The present general Method then I take to be, *First*, very Immethodical; *Second*, Difficult; and *Thirdly*, Dilatory.

First, 'Tis very Immethodical; in Teaching the Learner Addition of Numbers of different Denominations, before he knows Division, as will be prov'd under the next Head.

Second, In Teaching the Rules of Proportion before the Doctrine of Fractions, without which 'tis impossible to give a just and adequate Solution to most Questions in single, much more when they come to compound and plural Proportions.

Secondly, 'Tis Difficult; and that both in the General, and in many particular Rules.

First, 'Tis so in General, by being Immethodical, and by imposing a Multiplicity of hard Terms, and crabbed Definitions upon the Memory,

Memory, which ſerve only to puzzle and confound, but not in the leaſt to inform or inſtruct a Learner. How vaſtly Edifying muſt it needs be to a Learner, to have his Head fill'd with the ſeveral Diſtinctions between evenly even, evenly odd, and unevenly odd Numbers; between manifold and ſubmanifold, ſuperparticular manifold and ſubmanifold ſuperpartient Numbers! beſides abundance more, which as they can be of no real Uſe, ſerve only to amuſe and diſcourage the Learner.

Secondly, It is ſo in particular Rules; and *Firſt*, In carrying the Learner immediately from Addition of Plain, or (as they are ſometimes call'd) Abſtract Numbers, to thoſe of different Denominations, *viz.* Coin, Weight, Meaſure, *&c.* This alone has ſo diſcouraged many Novices, that deſpairing of ever making any ſatisfactory Progreſs, they have quitted the Study as an Attempt too difficult for them to engage in: Whereas were they previouſly inſtructed in the firſt Five Rules, and taught to divide the Sum of each leſſer Denomination by the Number of Units that will make one of the next Greater, ſetting down the Remainder under its own Denomination, and carrying the Quotient to

the ſaid next Greater to be added with them, and ſo proceed, the Difficulty would be quite remov'd, the Operations render'd eaſie, and the Reaſons of them demonſtrably evident: Beſides, in this Method no Points, Marks, or other defacing Characters are made uſe of; which both foul the Work, and tend much to the Diſgrace of the Accountant.

And here I cannot wholly omit mentioning the Old (and by many ſtill practiſed Way of teaching Diviſion, *viz.* by cancelling the Figures, and of proving Multiplication and Diviſion by the Croſs; but becauſe they begin now to be diſuſed, eſpecially by the more expert Maſters, 'tis ſufficient here to mention them.

Second, In the Method of Teaching the Rule of Practice, by dividing it into Seven different Caſes, and obliging the Learner to have Two Tables of Aliquot Parts, one of a Shilling, the other of a Pound Sterling, perfectly in Memory; whereas that very uſeful Rule is perform'd by one general, ſhort, yet copious, and regular Method, deduced from the Parts of a Pound Sterling only.

Thirdly, In the Manner of Extracting the Roots, eſpecially the Cube, (for higher is ſeldom if ever taught) which by involving and

other

other tedious Ways do form Diviſors, Ablatiums, *&c.* which help to grope out by Trials the ſeveral Figures in the Root: Whereas the Roots of the ſeveral Powers, tho' never ſo high, may be, and are, with much more Eaſe and Expedition, and abundant leſs Figures, extracted by one General New Method of converging Series.

That Teacher's Skill muſt ever be preferr'd,
Who can eaſe hard Things; not make Eaſie hard.

Thirdly, It is dilatory, and protracting of Time: *Firſt*, Becauſe all difficult Methods are naturally ſo: *Second*, Becauſe it runs the Art into needleſs Rules and Diſtinctions, ſuch as the Rule of Three in whole Numbers; *ſecond*, The Rule of Three in vulgar Fractions; *thirdly*, The Rule of Three in Decimals, *&c.* Whereas if Fractions Vulgar and Decimal are firſt taught, (and I could never diſcover in all my Practice of Teaching, but they were as readily conceiv'd before as after) theſe unneceſſary Diſtinctions will be avoided, and the Whole of that Noble Rule taught together, and by that Means much Time gain'd, which ought to be a principal Conſideration with all Maſters.

The Method then which I would in General recommend, (and which I have ſucceſsfully practiſed in my School for more than Fifteen Years) is, *Firſt*, That the Learner be taught to divide readily, before he attempts Addition, *&c.* of Numbers of different Denominations.

Second, That Fractions Vulgar and Decimal be taught, before a Step be taken in the Rules of Proportion.

Thirdly, That the Rules of Practice be taught after the Manner mention'd laſt Page, which was firſt ſhewn the World by the late Ingenious Mr. *John Knott*, Mathematician; and ſince him by Mr. *Edward Hatton*, in his intire Syſtem of Arithmetic. *Fourthly*, That Extraction of Roots, eſpecially all above the Square, be taught by the Method already mention'd; which muſt ever be preferable to the old and ſtill common Way, ſo long as an eaſie and conciſe Method is to be preferr'd before an intricate and tedious one. This Method (I ſpeak by Experience) will not only mightily abridge the whole Art, but render it much eaſier to be attain'd; and if the Maſter adapts his Queſtions to ſuch Things as fall under the Scholar's Notice, or about which he ſeems inclinable to be converſant,

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it will be a Means not only to make him the ſooner conceive the Reaſons of his Operations, but if he be a Lad of a Mercurial and inquiring Genius, beget ſo ſtrong an Inclination, and rivet ſuch an Affection in his Mind towards theſe Kind of Studies, as will never extinguiſh but with his Life.

The next Qualification eſſential to the well carrying on of Buſineſs is, **Book-keeping**, according to the *Italian* Manner of Debtor and Creditor, by double Entry; which, altho' by ſome ignorantly miſtaken for only a Branch of Arithmetic, is both a noble and uſeful Science of itſelf; ſo noble, that even for Matter of pure Speculation and Curioſity, it merits to be ſtudied by all *Virtuoſi*; and ſo uſeful, that no Accounts of *Meum* and *Tuum*, can by any other Method be adjuſted with that Exactneſs which this does afford: In ſhort, ſo deſervedly has it obtain'd amongſt the Men of Commerce, that he is now thought altogether unqualified for Buſineſs of any Importance, who has not been in ſome tolerable Meaſure inſtructed in it: Nor ought any Gentleman to think a competent Skill in Book-Keeping to be below him; for tho' it be not likely to get him an Eſtate, there is nothing of more Uſe and Efficacy to make him preſerve that he has.

If the Youths I am now concern'd for, were in general carefully inſtructed thus far, and in the Method I have now recommended, it would be found of eminent Service to them; and if to thoſe deſign'd for Artificers there be added ſome Skill in the Art of *Drawing*, and in the Rudiments of *Geometry* and *Mechanics*, (for to be wanting in theſe, is to be wanting in Eſſentials) ſuch (if Virtue accompany their Actions) muſt needs paſs their Servitude both acceptably and profitably to their Maſters, and with Pleaſure and Satisfaction to themſelves; nor can they miſs at their Entrance upon the Stage of Action on their own Account of meeting ſuch ſuitable Encouragement, as will produce not only a comfortable but plentiful Support.

But Youths of ſuch a Genius as I hinted at in the Cloſe of the Head of Arithmetic, and whoſe Parents are both able and willing to afford them a more bountiful Education, ſuch, next to Book-keeping I would (adviſe to) have inſtructed in that moſt admirable Analytic Art call'd **Algebra**, or (as the profound Dr. *Dee* calls it) *Algiebar*; an Art! which is the great Myſtery of Invention, the rich Magazine of new Diſcoveries, and the Grand *Arcanum* ſo religiouſly conceal'd by the Antients;

tients: And as there is no Study ſo extenſive, ſo redundant in uſeful Knowledge as the Mathematics, ſo there is no Part of that Study which gives the Mind ſuch a Habit of cloſe and demonſtrative Reaſoning as *Algebra* does; thereby not only freeing it from Prejudice, but rendering it capable of ſolving the greateſt Difficulties, and inveſtigating the moſt abſtruſe Problems. In ſhort, without *Algebra*, 'tis impoſſible to arrive at any Perfection in **Geometry**; and without both, 'tis impoſſible to be a good *Mathematician*. "For *Geome-* "*try* and *Algebra* (ſays Monſieur *Fontenelle*) "are the Keys of all the Enquiries that can "be made concerning Magnitudes." Nay ſo inſeparable are theſe two in Mathematical Studies, that the Great Dr. *Halley* uſes the Terms promiſcuouſly; for writing on the Excellency of our Modern *Algebra*, he ſcruples not to call it Modern *Geometry*; (*vide* Philoſophical Tranſactions, N°. 205.) ſo that it may well become a receiv'd Maxim, no *Algebraiſt*, no *Geometrician*; no *Geometrician*, no *Mathematician*.

Plain Trigonometry is the next Science, (after *Algebra* and *Geometry*) in which the young Mathematician ought to be inſtructed: From hence, as from a Fountain, flows vari-

ous useful Streams; such are the Arts of *Almietria*, and *Longimetria*, or taking all Sorts of *Heights* and *Distances*, whether accessible or inaccessible; *Opticks*, with its Concomitants *Caloptricks*, *Dioptricks*, and *Perspective*; *Geodæsia* or Mensuration of Land, an Art by the Assistance of which, the Tranquillity of Mankind is preserv'd; *Fortification*, *Navigation*, *cum multis aliis*. To this last mention'd Science it is we owe not only our Safety, (the greatest Blessing of a Nation) but whatever the most distant Parts of the Habitable World produce, that are desirable either for Use, or Ornament, are brought and laid at our Doors, exchanged for our Superfluities only.

Sure he who first the dang'rous Passage try'd,
In harden'd Oak, his harder Heart did hide;
Not Death's most dreadful Forms could him affright,
Who unconcern'd, and with a stedfast Sight,
Could view the rising Surges Mountain Steep,
And hideous Monsters rouling in the Deep;
Could calmly through the Ranks of Ruin go,
With Storms above, and direful Rocks below:
Who cou'd th' Eternal Fences over leap;
And pass at Pleasure thro' the boundless Deep,

But let me beg leave here to digress a little, while I encounter a common Objection made against such Teachers of *Navigation* as have never

never been in the Practice at Sea, *viz.* "That "they may be very well skill'd in the Theory, "but being deficient in the practical Part, 'tis "impoſſible for them to teach it, and yet, "that is what all Seamen rely on."

The Whole of this Objection turns upon the Word *practical*, which the Objectors always have and ſtill do uſe ſo ambiguouſly, as renders it difficult to attain their Meaning. For,

Firſt, If by *practical* Navigation they mean only the Knowledge of the Parts of the Ship, her Tackling, and the laborious Working her at Sea. I anſwer, Ha! Ha! He!

Second, If by that Term they intend Domeſtic Navigation, *viz.* The Knowledge of the Tides and their Settings; the Coaſts and their Soundings; Sands, Shoals, Rocks, *&c.* I anſwer,

This indeed requires more of Experience than any other Kind of Inſtruction; but as this is ſo mean a Part of this Noble Art, that he who has no further Skill therein, than to go Coaſting Voyages, is by no Means to be eſteem'd an expert Mariner; ſo I cannot think that the Objectors intended this. But,

Thirdly, By *practical* Navigation they might very probably mean: *Firſt*, The ſhewing the practical Uſes of the ſeveral Caſes

Caſes of Plain Sailing: *Second*, The Teaching the Uſe of Nautical Inſtruments: *Thirdly*, The taking and working an Obſervation: *Fourthly*, The Learning to prick a Chart: *Fifthly*, The Manner of keeping a Sea Journal, working a Days Log in all Caſes of Wind and Weather; making or ſhort'ning Sail, Trying, Hulling, *&c.* With the Way of making Allowance for all known Impediments, by which Rational Corrections are made: Theſe, I ſay, they might probably mean; and if they did, then my anſwer is,

That the Objection is Falſe in Fact, and meanly begs the Queſtion in Diſpute: For all the Particulars above-mention'd are very accurately taught, by ſuch as never entred upon the Practice at Sea, and from Treatiſes wrote by Gentlemen who were both able Mathematicians and experienced Navigators: So that either the Writers of practical Navigation have all along impoſed upon the World, and all Teaching a Shore is utterly vain; (and then, oh! ſad *Dilemma*, What will become of the Mariner Schools?) Or the Teachers I am now concern'd for, are upon a Level with the Mariners; conſequently the Objection is void. As for what the Ingenious Mr. *Joſhua Kelley* ſays, in his

Modern

Modern Navigators Compleat Tutor; 'tis evident his chief Aim was againſt ignorant Impoſtors, and negligent Half Teachers; Perſons who have neither ſufficient Skill, Honeſty, nor Fidelity for ſuch an Imployment; and I would have it always remember'd, that 'tis not my Purpoſe to defend any ſuch, but only to vindicate ſuch Land Teachers as are Maſters of what they profeſs, and againſt whom lies no Objection but their not having been in the Practice at Sea; and ſuch, I hope, I have eſtabliſhed upon a Level with the experienced Mariners who teach on Shore. And laſtly, as to myſelf, I can aſſure the Reader, my Method of Teaching this Art has been ſhewn to, and highly approv'd by many of the ableſt Mariners on Board His Majeſty's Ships of War.

But begging Pardon for this Digreſſion, 'tis Time for me to reſume my proper Subject, and acquaint my young *Tyro* who intends to make a further Progreſs in Mathematical Learning, that the next Particular he ought to be inſtructed in, is **Conic Sections**; eſpecially in the principal Properties of the Three Chief, *viz.* The *Parabola*, *Hyperbola*, and *Ellipſis*.

Then

Then the Principles of **Aſtronomy**, which explains the Doctrine and Uſe of the Globes, and *Phænomena* of the Heavens, according to the ſeveral receiv'd *Hypotheſes*; the moſt Remarkable of which are, the *Ptolemaic*, *Tychonic*, *Semi-Tychonic*; but more eſpecially the *Copernican*, (or Old Syſtem of *Philolaus*, if not *Pythagoras*, reviv'd) which is now the moſt generally receiv'd, as explaining the Motions whence the Appearances ariſe, after the moſt uniform, and conſequently moſt agreeable Manner to infinite Wiſdom.

'Tis this unfolds high Heav'n's myſterious Laws,
And of th' Appearances explores the Cauſe;
This treads the Abyſs *above, tells whence begun*
The Dance of Planets round the radient Sun;
What cauſe the diff'rent Seaſons, and delays
The Summer Nights, and ſhortens Winter Days:
Explains the Motions of the wandring Moon;
And whence proceed th' Eclipſes of the Sun:
How Earth's dark Shade blots Cynthia's *gilded Wane,*
While fooliſh Men beat ſounding Braſs in vain:
'Tis this unvails Dame Nature's dark Diſguiſe,
Which ſhuns the groſs Acceſs of Vulgar Eyes.

Next, **Spherical Trigonometry**, with the Application thereof, in Solving the ſeveral Problems of *Geography* and *Aſtronomy* by Calculation. Then (as Appendants to this) *Great Circle Sailing*, *Dialing*, *&c.* After ſuch an

an Acquiſition as I have been now pleading for gain'd at School, What further Progreſs may we not reaſonably expect from an apt Genius, aſſiſted with all proper Helps? For as,

No Art without a Genius can prevail,
So Parts without the Help of Art will fail;
But both Ingredients when conjointly met,
Render the happy Character complete.

I ſhall cloſe all with a ſhort Exhortation to Parents in general, that they would be prevail'd upon to conſider their Childrens future Welfare, ſo far as not to intruſt ſo difficult and important a Task as their Education in the Hands of Bold and Ignorant Pretenders: Perſons! who can neither ſpell *Engliſh*, write Senſe, nor ballance an Account wherein is the leaſt Intricacy; but deſtitute of all Merit, both Natural and Acquired, and furniſh'd only with a Stock of Aſſurance, will in Defiance of Nature and the Laws, ſet up for Teachers; and by ſoothing the Covetouſneſs of ſome, and impoſing upon the Ignorance of others, not only ſpoil the Buſineſs, but rob the miſtaken Parents of their Money, and the unhappy Children of their never to be retriev'd Time, for all which preditory Practices they ſcarce gain to themſelves

ſelves a bare and indigent Subſiſtance. Theſe are the Locuſts which generally infeſt the Country, the common Peſt of this Branch of Education; and if, (as it is an undoubted Truth) every Perſon that is Maſter of an Art, is not qualified to teach that Art; How much is the Fate of thoſe Children to be deplor'd, who are ſo unhappy as to be placed under the Tuition of ſuch Maſters? While they labour under the invincible neceſſity of being bred in the groſſeſt Ignorance, even of thoſe Qualifications eſſential to their ſeveral intended Callings, and abſolutely neceſſary towards recommending them to the World?

Teaching (like Phiſic) Learn'd Profeſſors lacks,
But is (like that too) overſtock'd with Quacks.

I do, (I ſay) earneſtly exhort all Parents, that they would in the moſt ſerious Manner conſider their Childrens Intereſt, and not intruſt their Education in ſuch Hands; but rather take ſome Care that the Perſons who undertake this weighty Affair, come to them unexceptionably recommended, or be upon Examination found fitly qualified with reſpect to their Knowledge. Nor is this all; for, if upon Experience they be found defective either in Sobriety, Probity, Diligence, or Temper,

per, they are altogether unfit, (let their other Accompliſhments be ever ſo great) for ſuch an Imployment, and ought by all Means to be diſmiſt.

SCIENCES Mathematical *and* Mechanical, *Taught and Practiſed by the Author, are,*

Firſt, *Arithmetic*, in all its Species. Second, *Merchants Accounts*, after the *Italian* Method of double Entry. Thirdly, *Algebra*, with the Solution of all Kinds of adfected Equations in Numbers. Fourthly, *Geometry*; Theorical in its ſeveral Propoſitions, Problems, Theorems, and Demonſtrations: Practical in Surveying Land, Meaſuring Board, Glaſs, Paving, Tyling, and all other Superficies: Likewiſe in the Art of Gauging, and Meaſuring Shipholds, alſo Timber, Stone, and all other Solids. Fifthly, *Trigonometry* Plain and Spherical, with their practical Applications. Sixthly, *Aſtronomy*. Seventhly, *Chronology*. Eighthly, *Dialing*.

Dialing. Ninthly, *Navigation*, Theorical and Practical. Tenthly, *Mechanics*; which explains the Principles whereon is founded the *Machaniſm*, (or Artificial Contrivance) of the ſeveral Engines uſeful in the Concerns of Life, with other Curious and Uſeful Sciences.

Alſo the Uſe of the Globes, and other Mathematical Inſtruments: And for their greater Conveniency and Expedition, Learners may be Boarded at his Houſe in *Yarmouth*.

FINIS.